

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
CHOI, Bum-Gyu

Customer No.: 30827

Application No.: 10/541,844

Confirmation No.: 8704

Filed: January 6, 2006

Art Unit: 1792

For: ORGANIC SILOXANE RESINS AND
INSULATING FILM USING THE SAME

Examiner: Erma C. Cameron

MS AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DO NOT ENTER: /ECC/

04/02/2010

AMENDMENT AFTER FINAL OFFICE ACTION

Sir:

In response to the Final Office Action dated December 31, 2009, please amend the patent application identified above as follows:

INTRODUCTORY COMMENTS

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 4 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

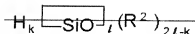
1. (Currently Amended) Organic siloxane resins for insulation films having a dielectric constant in the range of 2.24 to 2.48 and a mechanical strength in the range of 6 to 8 GPa, which are condensed polymers, manufactured by a hydrolysis and condensation reaction of silane compounds consisting essentially of one or more kinds of hydrosilane compounds in the presence of a base catalyst, wherein the only hydrosilane compounds, wherein at least one hydrosilane compound [[have]] has the following Chemical Formula 1, or are oligomers manufactured from the silane compounds in the Chemical Formula 1 or cyclic siloxane compounds having the following Chemical Formula 2, and the weight average molecular weight of the resins is at least 5,000;

[Chemical Formula 1]



wherein R¹ is independently fluorine, aryl, vinyl, allyl, or linear or branched alkyl having 1 to 4 carbon atoms, or alkoxy; and n is an integer of 1 to 3; and

[Chemical Formula 2]



wherein R² is independently fluorine, aryl, vinyl, allyl, or linear or branched alkyl having 1 to 4 carbon atoms, or alkoxy; and k and I are integers of 3 to 10.

2-4. (Canceled)

5. (Currently Amended) Compositions for forming insulating films comprising said organic siloxane resins having a dielectric constant in the range of 2.24 to 2.48 and a mechanical strength in the range of 6 to 8 GPa, manufactured according to Claim 1.

6. (Currently Amended) A method of forming insulating films using organic siloxane resins comprising the steps of:

- a) preparing an organic siloxane resin according to claim 1;
- b) dissolving the organic siloxane resin in an organic solvent to prepare a solution;
- c) forming an insulating film by coating the solution; and
- d) drying and hardening the insulating film formed in the step c) to prepare insulation films having dielectric constant in the range of 2.24 to 2.48 and mechanical strength in the range of 6 to 8 GPa.

7. (Previously Presented) The method of forming a insulating film using said organic siloxane resins according to Claim 6, further comprising a step, after the above step b), of adding one or more kinds of additives selected from the group consisting of organic molecules, water, pH controlling agents, colloidal silica, and surfactants to said solution.

8. (Previously Presented) Insulation films using organic siloxane resins manufactured by drying and hardening insulating films formed by coating the solution, which is prepared by dissolving said organic siloxane resins according to Claim 1 in an organic solvent, onto a substrate.

9. (Previous Presented) Electronic devices comprising insulating films using organic siloxane resins manufactured by drying and hardening of insulating films formed by coating the solution, which is prepared by dissolving said organic siloxane resins according to Claim 1 in an organic solvent, onto a substrate.

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Office Action dated December 31, 2009 has been received and its contents carefully reviewed.

Claims 1, 5, and 6 have been amended. Support for this amendment may be found at least at, for example, ¶¶ [0018], [0019], [0027], [0028], [0032], [0033], [0036], [0053], [0054] and [0057] to [0059] of the Specification as originally filed. Thus, no new matter has been added. Claim 4 has been canceled without prejudice or disclaimer. Claims 2 and 3 have been previously canceled. Accordingly, claims 1 and 5-9 are currently pending. Reexamination and reconsideration of the pending claims are respectfully requested.

The Office Action rejects claims 1 and 4-9 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0055892 to Nishikawa et al. (hereinafter "*Nishikawa*") in view KR 20020097415 (hereinafter "*KR 415*") or KR 20040000709 (hereinafter "*KR 709*"). Claim 4 is now canceled and thus, the rejection with respect to this claim is now moot. As to the remaining claims, Applicants respectfully traverse the rejection.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. The combined teaching of *Nishikawa*, *KR 415*, and *KR 709* does not teach or suggest each and every element of claims 1 and 5-9, and thus cannot render these claims obvious.

Independent claim 1 recites, "[o]rganic siloxane resins...having a dielectric constant in the range of 2.24 to 2.48 and a mechanical strength in the range of 6 to 8 GPa, which are condensed polymers, manufactured by a hydrolysis and condensation reaction of only hydrosilane compounds, wherein at least one hydrosilane compound has the following Chemical Formula 1." *Nishikawa* fails to teach or suggest at least these elements of claims 1.

Nishikawa discloses a composition comprising at least one compound of $R_nSi(OR^1)_{4-n}$ ("compounds (1)") and at least one compound of $R^8_3SiOR^9$ ("compounds (4)"). See *Nishikawa*, ¶¶ [0006] to [0015]. Here, only the compounds (1) can be hydrosilane compounds but not the compounds (4). *Id.* Because *Nishikawa* discloses that " R^8 and R^9 each independently represents

a monovalent organic group,” but silent on that each group can be a hydrogen. *Nishikawa*, ¶ [0013], emphasis added. Therefore, *Nishikawa* fails to teach the element of “manufactured by a hydrolysis and condensation reaction of only hydrosilane compounds” as recited in claim 1. In addition, *Nishikawa* also fails to teach or suggest “dielectric constant in the range of 2.24 to 2.48 and a mechanical strength in the range of 6 to 8 GPa” of claim 1. *KR 415* or *KR 709* cannot cure this deficiency. *KR 415* only discloses organic silane compounds which are not hydrosilane compounds. See *KR 415 English translation*, pages 19-21 and Examples 1 and 2. Even though Chemical formula #2 of *KR 415* can be a hydrosilane (See *KR 415 English translation*, page 3), it still fails to teach or suggest that “only hydrosilane compounds” are hydrolyzed and condensed as recited in claim 1. Like *KR 415*, *KR 709* also fails to teach or suggest the features discussed above and cannot cure the deficiency of *Nishikawa*. Because the organic siloxane resin of *KR 709* should include Chemical Formula 2, which is not a hydrosilane compound. See *KR 709 English translation*, claim 1. In addition, dielectric constants disclosed in *KR 415* and *KR 709* are well outside the range as recited in claim 1, thus these references also fails to teach or suggest the element of “...dielectric constant in the range of 2.24 to 2.48 and a mechanical strength in the range of 6 to 8 GPa” as recited in claim 1. Accordingly, claim 1 is patentable over the combined teachings of *Nishikawa*, *KR 415* and *KR 709*. Likewise, claims 5-9 which variously depend from claim 1 are also patentable for at least the same reasons as discussed above. Applicants, therefore, respectfully request withdrawal of this rejection.

The Office Action rejects claims 1 and 4-9 under 35 U.S.C. §103(a) as being unpatentable over *KR 415* or *KR 709* respectively. Claim 4 is now canceled and thus, the rejection with respect to this claim is now moot. As to the remaining claims, Applicants respectfully traverse these rejections.

As discussed above, neither *KR 415* nor *KR 709*, singularly or in combination teach or suggest all the claimed elements. Therefore, the teachings of *KR 415* or *KR 709* cannot render claim 1 and dependent claims 4-9 obvious and Applicants respectfully request withdrawal of this rejection.

The Office Action rejects claims 1 and 4-9 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0106500 to Albano et al.

(hereinafter "*Albano*"). Claim 4 is now canceled and thus, the rejection with respect to this claim is now moot. As to the remaining claims, Applicants respectfully traverse this rejection.

Albano fails to teach or suggest at least the element of "only hydrosilane compounds...at least one hydrosilane compound has the following Chemical Formula 1." The Office Action mistakenly alleges that the starting silane meets the limitations of formula 1. *Office Action*, page 6. Applicants respectfully disagree. According to *Albano*, the starting material has the formula, $\{R_3SiO_{1/2}\}_a\{R_2SiO_{2/2}\}_b\{RSiO_{3/2}\}_c\{SiO_{4/2}\}_d$. See *Albano*, ¶¶ [0024] and [0025]. Even though the above formula in *Albano* can be a hydrosilane when R is a hydrogen, the remaining oxygen does not meet the limitation of formula 1 as recited in claim 1. Accordingly, *Albano* does not teach or suggest each and every element of claim 1 and dependent claims 5-9, and thus cannot render these claims obvious. Applicants, therefore, respectfully request withdrawal of this rejection.

The application is in condition for allowance and early, favorable action is respectfully solicited. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

Dated: March 31, 2010

Respectfully submitted,

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